

No. 830,102.

PATENTED SEPT. 4, 1906.

G. E. RICHMOND.  
MACHINE FOR PICKING AND CLEANING COTTON.  
APPLICATION FILED MAR. 5, 1906.

4 SHEETS—SHEET 1.

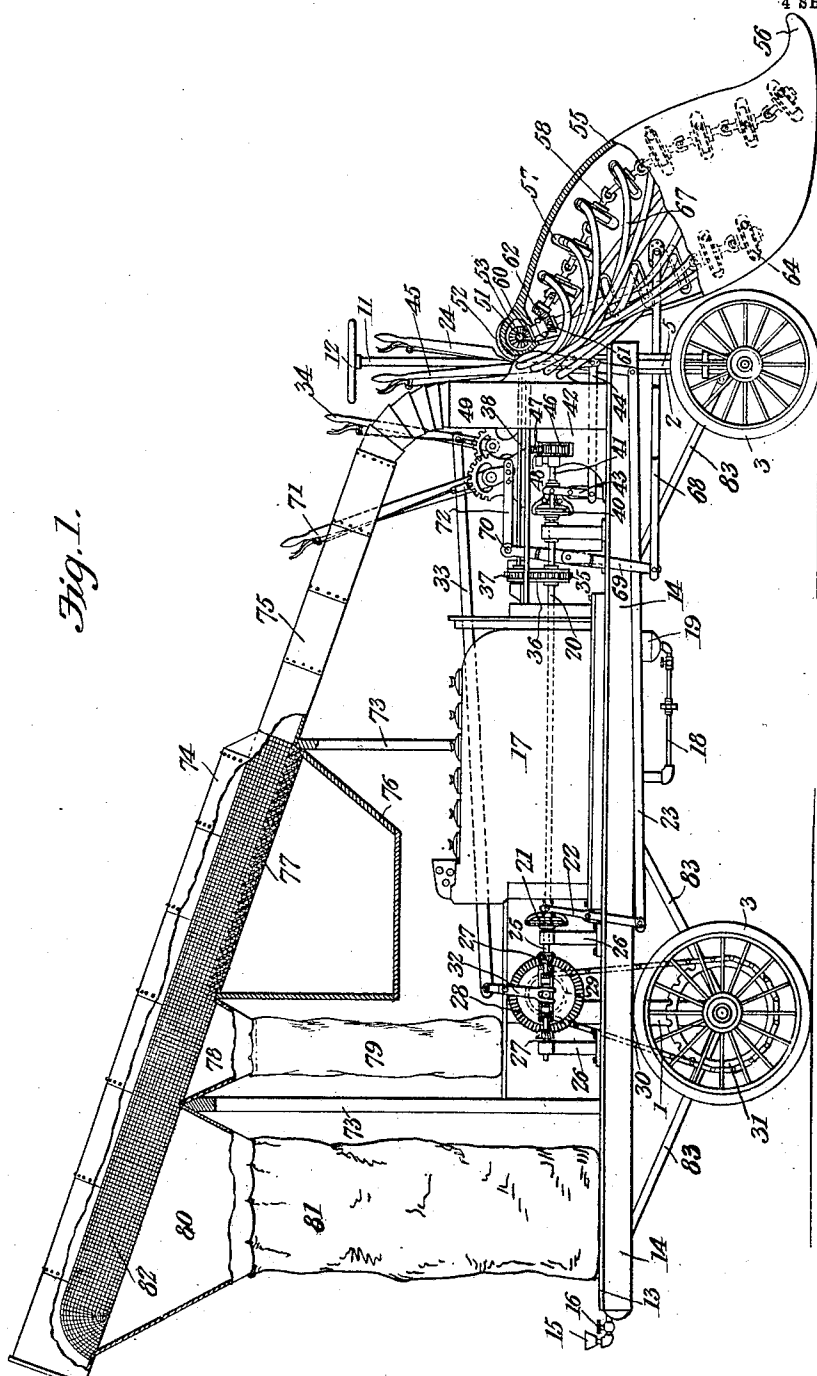


Fig. 1.

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*Herbert D. Lawson*

*George E. Richmond* INVENTOR

By *C. A. Snow & Co.*  
ATTORNEYS

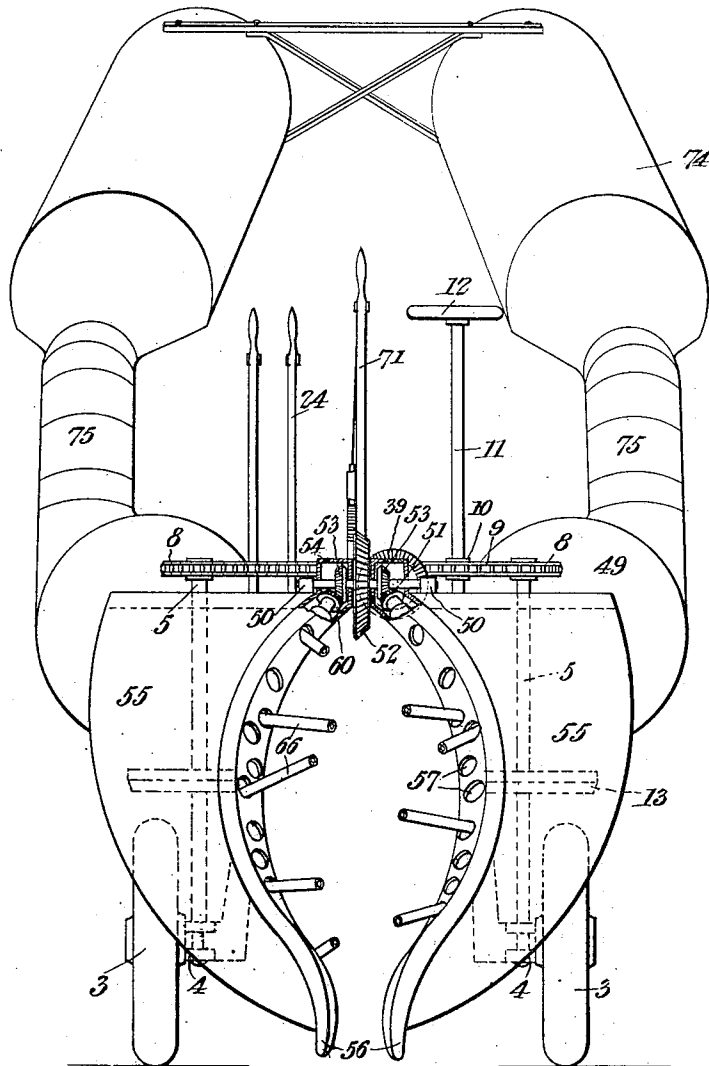
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4 SHEETS—SHEET 2.

Fig. 2.



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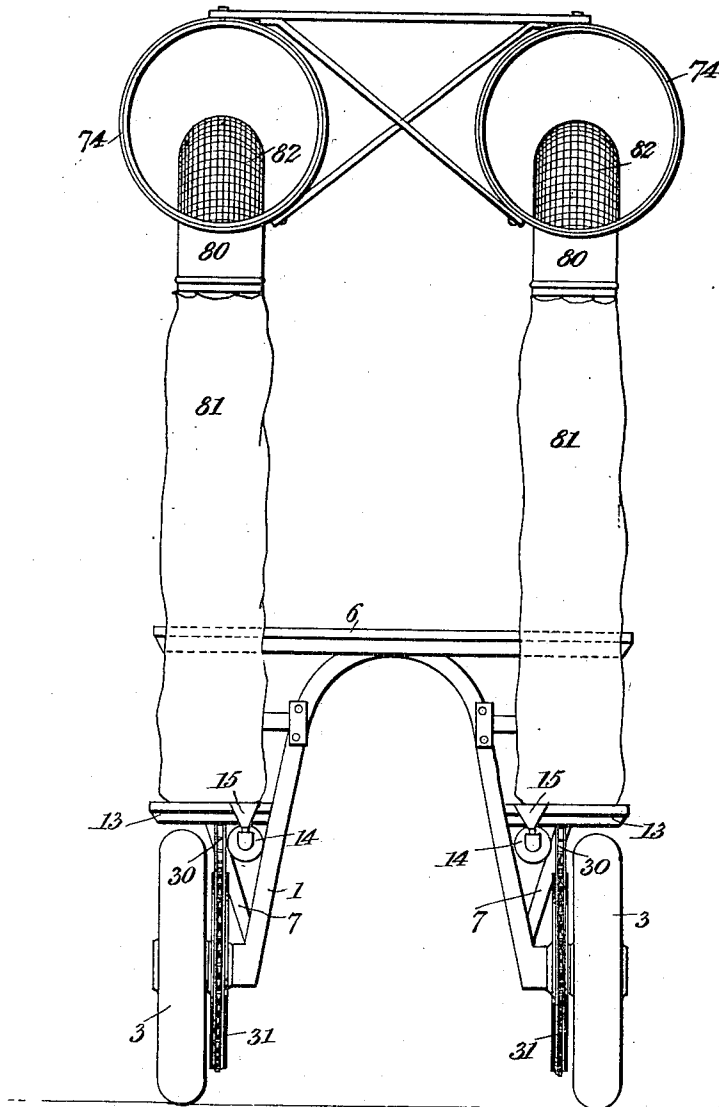
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4 SHEETS—SHEET 3.

Fig. 3.



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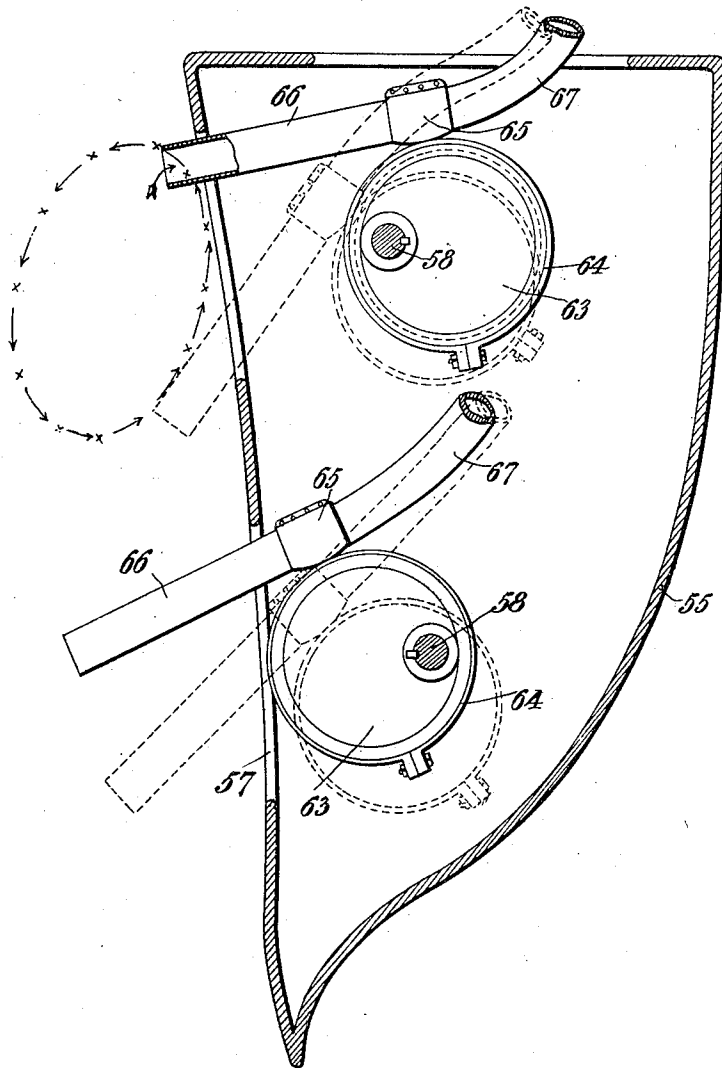
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4 SHEETS—SHEET 4.

*Fig. 4.*



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# UNITED STATES PATENT OFFICE.

GEORGE E. RICHMOND, OF HOUSTON, TEXAS, ASSIGNOR OF ONE-HALF  
TO CHARLES L. DESEL, OF HOUSTON, TEXAS.

## MACHINE FOR PICKING AND CLEANING COTTON.

No. 830,102.

Specification of Letters Patent.

Patented Sept. 4, 1906.

Application filed March 5, 1906. Serial No. 304,326.

*To all whom it may concern:*

Be it known that I, GEORGE E. RICHMOND, a citizen of the United States, residing at Houston, in the county of Harris and State of Texas, have invented a new and useful Machine for Picking and Cleaning Cotton, of which the following is a specification.

This invention relates to machines for picking and cleaning cotton; and its object is to provide mechanism of this character which can be drawn over a cotton-field and which will remove the ripe cotton from the plants and discharge it into a separator, where the cotton will be cleaned and finally discharged into suitable receptacles provided for it.

Another object is to provide pneumatic means for removing the cotton from the plants, said means being adapted to be applied to all portions of the plants automatically.

A further object is the provision of novel mechanism for projecting the pneumatic picking members along various planes and at different angles, so as to insure the removal of all cotton from the plants.

Other objects are to provide a compact and durable machine the frame of which is utilized as a receptacle for the fluid employed in the propulsion of the mechanism, and to provide means whereby the actuating of all parts of the machine are under the immediate control of one operator.

With the above and other objects in view the invention consists of a frame the sides of which are preferably formed of large pipes, which constitute receptacles for oil or other fluid used in the propulsion of the machine. A suitable motor is mounted on the frame and not only serves to propel the machine, but also actuates a fan which communicates, through a plurality of flexible tubes, with tubular picking-arms, which are movably supported within and extend from oppositely-disposed hoods. These hoods are pivoted to the forward end of the frame and have mechanism whereby they can be readily raised or lowered. Means are provided within the hoods for projecting the picking-arms toward each other and at constantly-changing angles, so that all portions of a plant located between the hoods will be acted upon by the arms and insure the removal of the cotton. The fan serves to suck the cotton through the picking-arms and to discharge it into a

separator which is supported by the frame of the machine and serves to remove sand, stones, and other objectionable materials from the cotton and deposit them in receptacles provided for that purpose, while the clean cotton is collected in separate receptacles.

The invention also consists in certain novel features of construction and combination of parts which will be hereinafter more fully described, and pointed out in the claims.

In the accompanying drawings is shown the preferred form of the invention.

In said drawings, Figure 1 is a view, partly in section and partly in side elevation, of the complete machine. Fig. 2 is a front elevation thereof, the bearings of the hoods being shown in section. Fig. 3 is a rear elevation, and Fig. 4 is an enlarged horizontal section through one of the hoods and showing some of the numerous positions adapted to be assumed by the tubular picking-arms.

Referring to the figures by numerals of reference, 1 and 2 are the rear and front axles, respectively, of the machine, each being formed of an upstanding yoke terminating in lateral extending bearings and in which the wheels 3 are mounted. The bearings 4 of the front wheels are preferably pivotally connected to the front yoke 1 and upon shafts 5, with which they are adapted to rotate. These shafts extend upward above the upper deck 6 of the machine, which is mounted on the yokes 1 and is held in proper position by means of braces 7, which extend upward from said yokes. The upper ends of the shafts 5 have sprockets 8 thereon, around which extends a chain 9, which engages a drive-sprocket 10. This drive-sprocket is secured to a shaft 11, which is mounted on the deck 6 near its forward end and has a hand-wheel 12, whereby it may be readily rotated. By means of this hand-wheel the machine can be guided while being propelled. Extending laterally from the yokes 1 and 2 and below the deck 6 are running-boards 13, which constitute the lower deck of the machine and which are also supported by braces 7. The sides 14 of the frame are secured to the yokes 1 directly below the lower deck and are in the form of pipes which are closed at their ends and have funnel-like inlets 15, whereby oil or other fluid for use in propelling the mechanism may be supplied to the

tubes. A valve 16 is located adjacent to each of the funnel-shaped inlets for the purpose of closing these tubes or reservoirs 14.

An engine, preferably of the hydrocarbon type, is mounted on the lower deck, as shown at 17, and this engine is supplied with fluid from the reservoirs 14 through pipes 18, which extend from depending tubular extensions 19, arranged upon each of the reservoirs 14. While I have shown only one of these pipes 18, it will of course be understood that one is provided for each reservoir 14.

A drive-shaft 20 extends from the engine 17 and is provided at one end with a friction-clutch 21, operated by a lever 22, which is connected by means of a rod 23 with an actuating-lever 24, located at the front end of the machine. The clutch 21 serves to couple shaft 20 with a short shaft 25, mounted in standards 26, and feathered on this shaft are oppositely-disposed beveled gears 27, which are adapted to successively mesh with the opposite portions of a large gear 28. This gear 28 rotates with a sprocket 29, on which is mounted a drive-chain 30, extending over a sprocket 31, which rotates with one of the rear wheels 3. The gears 27 are adapted to be shifted into or out of mesh with the gear 28 by means of a lever 32, which is connected, by means of a rod 33, with an operating-lever 34, mounted adjacent to the forward end of the machine. Mounted on the shaft 20 adjacent to its other end is a sprocket 35, which drives a chain 36, extending over a sprocket 37 on a shaft 38. This shaft extends longitudinally of the center of the machine and adjacent to the upper deck 6 thereof, and at its forward end it is provided with a gear 39, which is for the purpose hereinafter more fully described.

A friction-clutch 40 is disposed at the forward end of shaft 20 and serves to transmit motion therefrom to a short shaft 41, mounted at the forward end of the machine within a standard 42. This friction-clutch is adapted to be thrown into or out of operative position by means of a lever 43, which is connected by a rod 44 with an actuating-lever 45. A gear 46 is secured to shaft 41 and meshes with a smaller gear 47. This last-mentioned gear is keyed or otherwise fastened to a shaft 48, which extends into a fan-casing 49 and has a suitable fan rotatable therewith and within the casing.

Journaled within bearings 50 adjacent to the center of the forward end of the machine is a shaft 51, on which is secured a gear 52, which meshes with the gear 39, hereinbefore referred to. Smaller beveled gears 53 are also secured to the shaft 51 adjacent opposite faces of gear 52, and each of these small gears 53 is inclosed by a box 54, which extends upward from a hood 55 of peculiar contour. The inner face of each hood is concaved in the direction of its length, but is sub-

stantially straight from front to rear. The rear of the hood is open and merges into the curved bottom thereof, while an upwardly-curved lip 56 is located at the lower forward end of the hood. The outer and upper surface of the hood is convexed and is of substantially the proportions shown in the drawings.

A series of slots 57 is formed in the inner face of each of the hoods 55, and journaled within the hood in rear of these slots are flexible shafts 58, each of which is preferably formed of a series of sections connected by universal joints, as shown at 59. The shafts are therefore capable of conforming with the contour of the hood and are at the same time capable of rotating. One of the shafts 58 is preferably disposed adjacent the rear of the hood, while the other shaft is located adjacent the front thereof. The rear shaft 58 has a gear 60, which meshes with the gear 53, and another gear 61 is secured to said shaft and meshes with and is adapted to rotate a gear 62, secured to the forward shaft 58. Secured to each shaft 58 in rear of the slots 57 are eccentrics 63, surrounded by straps 64, to which are secured clips 65. All of the eccentrics on each shaft are disposed out of alinement, so that during the rotation of the shaft the eccentrics will follow each other in their rotation. Each of the clips 65 engages a tubular picking-arm 66, which extends through one of the slots 57, and this picking-arm constitutes the end portion of the flexible tube 67, which opens at one end into the fan-casing 49.

Each of the boxes 54 is pivotally mounted on the shaft 51, and therefore the two hoods 55 are capable of swinging vertically. In order that these hoods may be raised and lowered by the operator, a rod 68 is pivoted within each of the hoods, and these rods are also pivoted to levers 69, connected by a cross-rod 70. An actuating-lever 71 is connected to the cross-rod by means of a link 72, and it is therefore apparent that by the proper manipulation of lever 71 the two levers 69 can be swung in unison, so as to raise or lower the hoods, as desired.

Supported above the frame of the machine upon standards 73 is an inclined cylindrical separator 74, which is open at its ends. This separator is inclined upward from the forward portion of the machine, and its lower front end communicates with the fan-casing 49 through an outlet-pipe 75. A sand-box 76 is suspended from the forward portion of the separator and communicates with the interior thereof. The inlet end of the box is provided with riddles 77, which are inclined rearwardly and serve to retard sand and direct it into the box, but which will not hinder the passage of cotton therefrom. A hopper 78 depends from the separator adjacent its center and is adapted to direct stones

and other heavy particles into a bag 79, which may be secured to the hopper and is adapted to be supported on the deck 6. Depending from the rear portion of the separator is a large hopper 80, which is adapted to open into a detachable bag 81, which may be mounted on the lower deck 13 of the machine. A wire screen, 82 extends across the separator from the inlet end thereof to the upper end of hopper 80 and serves to deflect the cotton into the hopper 80 and at the same time permits air to escape from the outlet end of the separator and to carry dust and other like undesirable particles therewith.

While in the drawings and description of this machine I have shown and described but one engine and mechanism operated by it, it is to be understood that all of the mechanism herein described is duplicated, there being an engine, 17 at each side of the machine and said engine actuating mechanism which is the exact duplicate of that described and illustrated. I do not, however, utilize duplicates of the actuating levers 24, 45, and 34, but couple said levers in any preferred manner to the duplicate mechanisms adapted to be operated by them.

In using this machine for picking and separating cotton the same is propelled forward by throwing the clutch 21 into engagement with the shaft 25 and by shifting the gears 27, so that rotary motion will be transmitted in the proper directions from the shafts 25 to gears 28 and chains 30. The machine is guided along the rows of cotton so that the plants will be embraced by the hoods 55. By properly shifting the clutch 40 motion is transmitted from the motor to the fan within casing 49, and a suction is therefore established through the flexible tubes 67. Shaft 38 receives its motion from shafts 20 through the chain 36, and the gear 39 thereof rotates the gear 52. As this gear is secured to shaft 51, the two smaller gears 53 will also be rotated, and therefore the flexible shafts 58 will be caused to revolve. Eccentrics 63 will therefore swing around the shafts and cause the tubular picking-arms 66 to be successively projected and retracted through the slots 57, the free ends of said arms describing an ellipse substantially similar to that shown by dotted lines in Fig. 4. As the picking-arms of the two hoods are disposed at opposite sides of the plants, it will be obvious that this swinging, projecting, and retracting movement of said arms will result in substantially all portions of the plant being contacted by the arms, and therefore the cotton will be sucked into the arms and through the tubes and then discharged by the fans into the separators. Sand and other similar particles will fall between the riddles 77 into box 76, stones and other large objectionable particles will fall

through the hoppers 78 into bags 79, the dust, &c., will escape with the air through the screen 82, and the cotton will fall into the hoppers 80 and bags 81.

It will be seen that all portions of the mechanism are operated by levers disposed at one end of the machine, and therefore the entire operation of picking and cleaning cotton can be controlled by one operator. The hoods 55 can be raised or lowered so as to act upon plants of different heights and to escape or pass over any objects which may be in the path of the machine and which might injure the hoods if the same should come in contact therewith. It will of course be understood that the yokes supporting the frame must be suitably braced, and for that reason the brace rods or beams 83 are provided. By utilizing the two gears 27 the machine can be driven either forward or backward at the will of the operator, and by properly manipulating the clutch 21 the machine may be stopped or started. The two separators are suitably connected in any desired manner, as by means of braces 84, which hold them rigidly connected.

I claim—

1. In a machine of the character described, the combination with a suction device, of flexible tubular picking-arms connected and movable in relation thereto and mechanism for positively actuating said arms independently of the suction device.

2. In a machine of the character described, the combination with a suction device; of oppositely-disposed tubular picking-arms movably connected to the suction device and mechanism for positively actuating said arms independently of the suction device.

3. In a machine of the character described, the combination with a suction device; of oppositely-disposed flexible tubular picking-arms movably connected to the suction device and mechanism for positively actuating said arms independently of the suction device.

4. In a machine of the character described, the combination with a support, and a suction device; of tubular picking-arms connected to the suction device and movably mounted within the support and mechanism for positively actuating said arms independently of the suction device.

5. In a machine of the character described, the combination with a support, and a suction device; of tubular picking-arms connected to the suction device and movably mounted within the support, and means for successively projecting and retracting the arms within the support.

6. In a machine of the character described, the combination with a support, and a suction device; of flexible tubular picking-arms movably connected to the suction device and

within the support, and means for projecting said arms from and retracting them within the support.

7. In a machine of the character described, the combination with a support, and a suction device; of oppositely-disposed tubular picking-arms movable in the direction of their lengths within the support and connected to the suction device.

8. In a machine of the character described, the combination with a support and a suction device; of oppositely-disposed tubular picking-arms movably mounted within the support and connected to the suction device, and means for successively projecting the arms from and retracting them into the support.

9. In a machine of the character described, the combination with a plant-embracing support, and a suction device; of tubular picking-arms movably mounted within the support and connected to the suction device, and means for projecting said arms in various directions toward plants.

10. In a machine of the character described, the combination with oppositely-disposed hoods adapted to receive plants therebetween; of a suction device and tubular picking-arms connected to the suction device and movable in the direction of their lengths within and adapted to project from the hoods.

11. In a machine of the character described, the combination with oppositely-disposed hoods; of a suction device, and tubular picking-arms connected to the suction device and movable in the direction of their lengths within and extending from the hoods, the arms of the two hoods projecting toward one another.

12. In a machine of the class described, the combination with oppositely-disposed hoods having their adjoining faces slotted; of a suction device and tubular picking-arms connected to the suction device and mounted to move in the direction of their lengths within the slots.

13. In a machine of the character described, the combination with oppositely-disposed hoods having their adjoining faces slotted; of a suction device and tubular picking-arms connected to the suction device and movably mounted within the slots, and means for projecting and retracting the arms within the slots.

14. In a machine of the character described, the combination with oppositely-disposed hoods having their adjoining faces slotted; of a suction device and tubular picking-arms connected to the suction device and movably mounted within the slots, and means for projecting, retracting, and swinging the arms within the slots.

15. In a machine of the character described, the combination with oppositely-dis-

posed hoods having their adjoining faces slotted; of a suction device, tubular picking-arms movably connected to the suction device, and means for successively projecting, swinging and retracting the arms within the slots.

16. In a machine of the character described, the combination with oppositely-disposed hoods having their adjoining faces slotted; of a suction device, tubular picking-arms movably connected to the suction device, and means for moving the arms successively to project, swing and retract them within their slots.

17. In a machine of the character described, the combination with oppositely-disposed hoods having concaved adjoining faces provided with slots; of a suction device, tubular picking-arms movable in the direction of their lengths within the slots, and flexible tubular connections between said arms and the suction device.

18. In a machine of the character described, the combination with oppositely-disposed slotted hoods, of a suction device, tubular picking-arms mounted within the slots, flexible tubular connections between the arms and suction device, and means for successively projecting and retracting the arms within the slots.

19. In a machine of the character described, the combination with oppositely-disposed slotted hoods, of a suction device, tubular arms mounted within the slots, flexible tubular connections between the arms and suction device, and means for successively projecting, swinging and retracting the arms within the slots.

20. In a machine of the character described, the combination with a hood, and a suction device; of a rotatable eccentric within the hood, a tubular picking-arm connected to and movable with the eccentric, and a tubular connection between the picking-arms and the suction device.

21. In a machine of the character described, the combination with a hood and a suction device; of a rotatable eccentric within the hood, a tubular picking-arm connected to and movable with the eccentric, and a flexible tubular connection between the picking-arm and the suction device.

22. In a machine of the character described, the combination with a hood and a suction device; of a flexible rotatable shaft mounted within the hood, eccentrics carried thereby, tubular picking-arms secured to and movable with the eccentric, and flexible tubular connections between said arms and the suction device.

23. In a machine of the character described, the combination with a slotted hood of irregular contour, and a suction device; of a rotatable shaft conforming to the contour of the hood, tubular picking-arms mounted

within the hood, tubular connections between said arms and the suction device, and means operated by the rotation of the shaft for successively projecting, swinging and retracting the arms within the hood.

24. In a machine of the character described, the combination with a hood of irregular contour, and a suction device; of a rotatable shaft within the hood and conforming to the contour thereof, eccentrics mounted on the shaft, tubular picking-arms connected to and movable with the eccentrics, and flexible tubular connections between the arms and suction device.

25. In a machine of the character described, the combination with oppositely-disposed slotted hoods, of flexible shafts rotatably mounted within the hoods, a drive-shaft, means for transmitting motion from said shaft to the flexible shafts, a suction device, tubular picking-arms communicating therewith, and means operated by the flexible shafts for successively projecting and retracting the picking-arms.

26. In a machine of the character described, the combination with a hood and a suction device; of an eccentric rotatably mounted within the hood, a strap rotatable upon the eccentric and a tubular picking-arm secured to the strap and connected with the suction device.

27. In a machine of the character described, the combination with a hood and a suction device; of an eccentric rotatably mounted within the hood, a strap rotatable upon the eccentric, a tubular picking-arm secured to the strap and movable therewith, and a flexible tubular connection between said arm and the suction device.

28. In a machine of the character described, the combination with a suitable support having power mechanism thereon; of a hood pivotally mounted upon the support, tubular picking-arms within the hood, means within the hood and operated by the power mechanism for successively projecting and retracting the picking-arms in the direction of their lengths.

29. In a machine of the character described, the combination with a support having power mechanism thereon; of oppositely-disposed hoods pivotally mounted upon the support, picking devices mounted within the hoods, and means carried by the hoods and operated by the power mechanism for actuating the picking devices in the direction of their lengths.

30. In a machine of the character described, the combination with a support and hoods pivoted thereto; of a suction device carried by the support, tubular picking-arms mounted within the hoods, flexible tubular connections between said arms and the suction device, power mechanism carried by the support, and means within the hoods and

operated by said mechanism for projecting the picking-arms from and retracting them into the hoods.

31. In a machine of the character described, the combination with a support having power mechanism thereon, and a suction device; of oppositely-disposed hoods pivotally and adjustably mounted upon the support, flexible shafts within the hoods and actuated by the power mechanism, tubular picking-arms within the hoods, flexible tubular connections between said arms and suction device, and means operated by the flexible shafts for successively projecting, and retracting the arms.

32. In a machine of the character described, the combination with a support, of oppositely-disposed hoods adjustably supported thereby, and pneumatic picking means extending through and movable in the direction of their lengths within the adjoining faces of the hoods.

33. In a machine of the character described, the combination with a support, of oppositely-disposed forwardly-extending hoods having their adjoining faces concaved and spaced apart at their forward ends, and pneumatic picking means extending through and movable in the direction of their lengths within the concaved faces of the hoods.

34. In a machine of the character described, the combination with a support, of hoods pivotally connected thereto and having their adjoining faces concaved, pneumatic picking means opening through the concaved faces of the hoods and movable in the direction of their lengths, and means for adjusting the hoods upon their pivots during said movement of the picking means.

35. In a machine of the character described, the combination with a support having power mechanism thereon and a shaft operated by said mechanism; of oppositely-disposed hoods pivoted upon the shaft, pneumatic picking devices within and extending from the adjoining faces of the hoods, and mechanism within the hoods and operated by said shaft for successively projecting the picking devices from and retracting them into the hoods.

36. In a machine of the character described, the combination with a support having power mechanism thereon and a shaft operated by said mechanism; of oppositely-disposed hoods pivoted upon the shaft and having slots in their adjoining faces, shafts rotatably mounted within the hoods and operated by the pivot-shaft, pneumatic picking devices extending through the slots, and means operated by the shafts within the hoods for successively projecting said devices from and retracting them into the hoods.

37. In a machine of the character described, the combination with a support and

a suction device thereon, of oppositely-disposed similar hoods pivotally connected to the support, tubular picking-arms movably mounted within the hoods and connected to the suction device and manually-operated means for swinging the hoods simultaneously.

38. In a machine of the character described, the combination with a portable frame having a separator thereon and hoods extending forward from and adjustably connected to the frame; of tubular picking-arms mounted within the hoods and movable in the direction of their lengths, a fan interposed between said arms for sucking material thereinto and discharging it into the separator, mechanism carried by the frame for independently or simultaneously propelling the frame and fan.

39. In a machine of the character described the combination with oppositely-disposed forwardly-projecting hoods adapted to receive plants therebetween; of a suction device, tubular picking-arms movably connected to the suction device and within and adapted to project from the hoods, and mechanism for positively actuating the picking-arms independently of the suction device.

40. In a machine of the character described the combination with oppositely-disposed forwardly-projecting hoods; of a suction device, tubular picking-arms connected to the suction device and within and extending from the hoods, the arms of the two hoods projecting toward one another, and mechanism for positively moving the arms independently of the suction device.

41. In a machine of the character described the combination with oppositely-disposed hoods having their adjoining faces slotted; of a suction device, tubular picking-arms connected to the suction device and mounted within the slots, and mechanism for positively operating the picking-arms independently of the suction device.

42. In a machine of the character described the combination with oppositely-disposed hoods having concaved adjoining faces provided with slots; of a suction device,

tubular picking-arms within the slots, flexible tubular connections between said arms and the suction device, and mechanism for positively actuating the arms independently of the suction device.

43. In a machine of the character described the combination with a support; of oppositely-disposed forwardly-projecting hoods adjustably carried by the support, pneumatic picking means within, and extending through the adjoining faces of the hoods, and mechanism for positively projecting said means from the hoods.

44. In a machine of the character described the combination with a support; of forwardly-projecting hoods adjustably connected to the support and spaced apart, the adjoining faces of the hoods being concaved, and pneumatic picking means disposed within the concaved faces of the hoods, and movable in the direction of their lengths.

45. In a machine of the character described the combination with a support; of forwardly-projecting hoods adjustably connected to the support and having their adjoining faces concaved to produce an opening therebetween of irregular contour, the concaved faces of the hoods being slotted from their rear to their front portions, and pneumatic picking devices movably mounted within said slots.

46. In a machine of the character described the combination with a support; of forwardly-projecting hoods adjustably connected to the support and having their adjoining faces concaved to produce an opening therebetween of irregular contour, the concaved faces of the hoods being slotted from their rear to their front portions, pneumatic picking devices within the slots, and mechanism for positively moving said devices within the slots.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

G. E. RICHMOND.

Witnesses:

CHAS. L. DESE,  
A. A. NOACK,